

CLAIMS

What is claimed is:

- 455 1. A multi-function microwave radio system comprising:
one or more data grid elements, each data grid element comprising:
one or more smart edge wireless hubs comprising: hub-radio means
for transmission and reception of radio signals; and a hub-micro-controller means for
selecting transmission and reception parameters of said hub-radio means ; and
460 a central processing unit comprising: a core-radio means for
transmission and reception of microwave signals; an internet packet switching means for
dynamically routing one or more information packets to said smart edge wireless hubs ; and
core-micro-controller means for selecting transmission and reception parameters of said core-
radio and of said hub-radio.
- 465 2. The system of claim 1, wherein said transmission and reception parameters include one or
more of a radio modulation type, a transmission frequency, an antenna type, a polarization
orientation and a polarization selection.
- 470 3. The system of claim 2, wherein said radio modulation type is selected from the group
consisting of Quadrature Amplitude Modulation (QAM), Quadrature Phase Shift Keying
(QPSK) and Orthogonal Frequency Division Multiplexing (OFDM).
- 475 4. The system of claim 2, wherein said antenna type is selected from the group consisting of
an omni antenna and a multiple sector antenna.
5. The system of claim 2, wherein said transmission frequency is selected by reference to a
centralized or distributed registrar of all frequencies available to all said smart edge hubs.
- 480 6. The system of claim 1, wherein said core-micro-controller means further includes a packet
measurement means for obtaining a quality-of-service measure related to said transmission
and reception of said radio signals; and wherein said selecting of said transmission and
reception parameters is responsive to said quality-of-service measure.

- 485 7. The system of claim 6, wherein said core-micro-controller means further includes means for adjusting a transmission power and/or a bandwidth of said core-radio means responsive to said quality-of-service measure.
8. The system of claim 1, wherein said central processing unit further includes means for
490 establishing a primary and a secondary transmission channel over diverse paths.
9. The system of claim 8, wherein said central processing unit further includes means for traffic rerouting responsive to a failure to transmit said information packet.
- 495 10. The system of claim 8, wherein said central processing unit further includes means for traffic rerouting responsive a traffic load imbalance.
11. The system of claim 1, wherein said information packets comprise secured, sealed
500 electronic packets.
12. The system of claim 11, wherein said secured, sealed electronic packets comprise header means responsive to packet tampering.
13. A multi-function microwave radio transmission method, comprising the steps of:
505 providing a central processing unit comprising a core-radio, a core-micro-controller and an internet packet switch ;
 providing one or more smart edge wireless hubs comprising a hub-radio and a hub-micro-controller;
 selecting one or more transmission and reception parameters for said core-
510 radio and said hub-radio using said core-micro-controller and said hub-micro-controller; and
 dynamically routing one or more information packets to said smart edge wireless hubs using said internet packet switch and one or more radio signals transmitted from said core-radio using said selected transmission and reception parameters.

515 14. The method of claim 13, wherein said transmission and reception parameters include one or more of a radio modulation type, an antenna type, a polarization orientation and a polarization selection.

15. The method of claim 14, wherein said radio modulation type is selected from the group
520 consisting of Quadrature Amplitude Modulation (QAM), Quadrature Phase Shift Keying (QPSK) and Orthogonal Frequency Division Multiplexing (OFDM).

16. The method of claim 14, wherein said antenna type is selected from the group consisting of an omni antenna and a multiple sector antenna.

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17. The method of claim 14, wherein said transmission frequency is selected by reference to a centralized or distributed registrar of all frequencies available to all said smart edge hubs.

18. The method of claim 13, further comprising the step of obtaining a quality-of-service
530 measure related to said transmission and reception of said radio signals using a packet measurement system; and wherein the step of selecting said transmission and reception parameters is further responsive to said quality-of-service measure.

19. The method of claim 18, further comprising the step of adjusting a transmission power
535 and/or a bandwidth of said core-radio responsive to said quality-of-service measure.

20. The method of claim 13, further comprising the step of establishing a primary and a secondary transmission channel over diverse paths using said central processing unit.

540 21. The method of claim 20, further comprising the step of rerouting traffic responsive to a failure to transmit said information packet.

22. The method of claim 20, further comprising the step of rerouting traffic responsive to a traffic load imbalance using said central processing unit.

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23. The method of claim 20, wherein said information packets comprise secured, sealed electronic packets.

24. The system of claim 23, wherein said secured, sealed electronic packets comprise
550 headers capable of detecting packet tampering.